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STATISTICAL REPORT ON 2529 CASES OF CANCER OF THE BREAST.

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Published for the Clinical Cancer Research Committee of the British Empire Cancer Campaign.

Received for publication July 16, 1948.

IN 1938–39 the Clinical Cancer Research Committee of the British Empire Cancer Campaign carried out a clinical survey of all cases of cancer seen in the hospitals, both Voluntary and L.C.C. in the Administrative County of London. This was done by means of questionnaires, one of which was filled in by the Registrars in the various hospitals for each patient and returned to the Clinical Cancer Research Committee for record. The work was interrupted by the outbreak of war after it had been in progress for 17 months. By this time 15,200 cases of cancer had been registered, of which 2529 (16·6 per cent) were cancer of the breast. These patients have now been followed up for five years or more and the records analysed. The full report will be published in due course by the British Empire Cancer Campaign, but the main findings are here presented.

There were 2152 primary and 377 recurrent cases. 23 of the 2152 primary cases were males (1·07 per cent) and 2129 were females (98·93 per cent)—the same ratio as found in other large series.

PRIMARY CASES—FEMALES (2129).

The percentage of single, married and widowed amongst the 2129 females is shown below, together with the corresponding figures from Lane-Claypon's (1926) report on cancer of the breast, in which figures for 508 cancer patients were compared with 509 controls.

Civil State.

	British Empire Cancer Campaign, 2129 cancer cases.		Lane-Claypon. 508 cancer cases.		Lane-Claypon. 509 control cases.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Single	471	22·1	116	22·8	87	17·1
Married	1236	58·0	292	57·5	321	63·1
Widowed	422	19·8	100	19·7	101	19·8

The difference between the percentages of single women in the cancer series and in the control series, $5{\cdot}7 \pm 2{\cdot}5$, is statistically significant. It will be seen that the percentages in the B.E.C.C. series are almost the same as those in Lane-Claypon's cancer series. The Registrar-General (1938) concludes from an analysis of 13,298 deaths from cancer of the breast that "at each age above 35 single women suffered considerably higher mortality than others from this cause."

Age Distribution.

Age distribution.	Single.	Married and widowed.	Total.
15–24	3	1	4
25–34	19	40	59
35–39	23	99	122
40–44	55	147	202
45–49	61	217	278
50–54	80	214	294
55–59	53	219	272
60–64	57	223	280
65–69	48	217	265
70–74	44	141	185
75–79	17	100	117
80–84	7	30	37
85 and over	4	10	14
Mean age	$55{\cdot}6 \pm 0{\cdot}6$	$57{\cdot}4 \pm 0{\cdot}3$	$57{\cdot}0 \pm 0{\cdot}4$
Standard deviation	$12{\cdot}8 \pm 0{\cdot}4$	$12{\cdot}5 \pm 0{\cdot}2$	$12{\cdot}6 \pm 0{\cdot}2$

Difference between mean ages of single and married $57{\cdot}4–55{\cdot}6 = 1{\cdot}8 \pm 0{\cdot}66$.

The mean age is 5–6 years higher than those given by Lane-Claypon (1926) and Wainwright (1931), due to the fact that the two latter series include only cases coming to hospital for operation, whereas the B.E.C.C. series includes all cases seen, whether operable or not. The youngest patient in the series was aged 15, and survived 5 years after enucleation of a tumour of 3 years' standing, which proved on histological examination to be an early adenocarcinoma. The oldest patient was aged 90, and died of recurrence 5 months after amputation of the breast for an ulcerating growth, proved histologically to be an adenocarcinoma.

Heredity.

A history of the patient's father having died of cancer of any region was given by 4·5 per cent of all patients, and of death of the mother from cancer of any region by 8·3 per cent, from cancer of the breast by 3·0 per cent. 382 patients gave histories of 452 parents or siblings having suffered from cancer, so that in 70 instances (3·3 per cent) more than one relative was affected. There were 17 instances of both parents having died of cancer amongst 1589 patients of known family history, or 1 in 93; the expectation of this occurring by chance is 1 in 151; Stocks and Karn (1933) found the expected frequency of this event for cancer of all regions to be 1 in 180, the numbers involved being 364 fathers and 323 mothers. As no information about family history was available for 25·4 per cent of the patients, it is impossible to draw definite conclusions from the figures.

Relation to the Menopause.

30·4 per cent of the single women and 25·5 per cent of the married had not reached the menopause, and in 2·6 per cent and 3·4 per cent respectively it was in progress when the disease first appeared. In 18·7 per cent and 18·3 per cent the question was not answered. Lane-Claypon (1926) has shown that the mean age of cessation of the catamenia in a series of 328 patients with cancer of the breast was not significantly different from that of a control series of 332 women.

Children and Miscarriage.

The percentage of childless marriages amongst 1658 married and widowed women was 16·1; Lane-Claypon found that 18·4 per cent of 261 women with cancer of the breast and 12·5 per cent of 280 control patients were childless. She concluded from a statistical study of the data by Major Greenwood that "the fertility of the cancer patients is definitely less than that of the control patients." As no information on this point was available for 13·5 per cent of patients in our series, it is impossible to say whether or not the figures support Lane-Claypon's conclusions. For the same reason we can give no reliable figures

	Number of cases.	Per cent.
Lump in breast	1649	77·4
Pain in breast	213	10·0
"Eczema" of skin of breast	57	2·7
Retraction of nipple	41	2·0
Referred pain	34	1·6
Symptoms due to metastases	34	1·6
Bloody discharge from nipple	26	1·2
Discharge from nipple	20	1·0
Lump in axilla	18	0·8
Loss of weight and general weakness	2	0·1
No symptoms. Tumour discovered during routine examination	34	1·6
Not stated	1	0·05

of the proportion of women with cancer of the breast who had or had not nursed their children. Lane-Claypon found that 14·6 per cent of the children of women who afterwards developed cancer of the breast were not nursed and 7·4 per cent of the children of those in the control series—a statistically significant difference.

First Symptom.

A lump in the breast was the first symptom complained of in 77·4 per cent of the patients, pain in the breast in 10·0 per cent, and other symptoms as shown in the table (see p. 214).

The 34 patients in whom the first symptoms were those due to metastases were found to have the following :

	Number of cases.
Symptoms due to enlarged axillary nodes . . .	2
,, ,, ,, supraclavicular nodes . .	3
,, ,, ,, lymph nodes elsewhere . .	1
,, ,, metastases in vertebral column . .	13
,, ,, ,, liver	5
,, ,, ,, lung	3
,, ,, ,, brain	3
,, ,, ,, skull	2
,, ,, ,, femur	2

Bloody discharge from the nipple was the first symptom in 26 patients. The histological reports on these tumours were : spheroidal cell carcinoma 8, duct carcinoma 7, adenocarcinoma 4, carcinoma, type not specified 1, squamous cell carcinoma 1, not examined histologically 5.

Interval from First Symptom to First Consulting a Doctor.

	Number of cases.	Per cent.
1 month and under	508	
1–2 months	266	44·1
2–3 ,, ...	164	
3–4 ,, ...	117	
4–6 ,, ...	208	15·3
6–9 ,, ...	136	
9–12 ,, ...	190	
12–18 ,, ...	83	
18–24 ,, ...	119	33·3
24–48 ,, ...	85	
Over 48 months	97	
Not stated	156	7·3

These figures show that there was serious delay on the part of 48·6 per cent of the patients in seeking medical advice, and in 8·6 per cent the interval was 2–4 years or more.

Advice and Treatment before Admission to Hospital.

	Number of cases.
No doctor consulted prior to coming to hospital	293
Referred to hospital without delay	1472
Advised to go to hospital, but delayed going there	99
Treated symptomatically for periods up to 3 months before reference	33
Treated symptomatically for periods of more than 3 months before reference	88
Reassured and told condition not serious	66
Not stated	78
Refused the treatment advised	22

Of the 1836 patients who consulted a doctor, 85·6 per cent were referred to hospital at once, though 5·4 per cent of these delayed in following this advice or perhaps had to wait some weeks for a vacant bed; 1·8 per cent were kept under observation and symptomatic treatment for periods up to 3 months, and 4·8 per cent for longer periods, but many of the patients in the latter group were in an advanced stage of the disease, or were unsuitable for operative treatment by reason of poor general condition. 3·6 per cent of the patients were reassured and told that there was nothing serious the matter. Only 1·0 per cent refused the treatment advised at hospital.

Findings on Examination in Hospital.

Location of tumour.	Number of cases.	Per cent.
Left breast	1114	52·3 ± 1·09
Right breast	1005	47·2
Both breasts	6	0·3
Not stated	4	0·2

Busk and Clemmesen (1947), investigating the site of 4139 Danish cases, found that the proportions were 111 on the left to 100 on the right—almost exactly the same figures as in our series—and that the difference was statistically significant. Ewing (1940) states that the disease appears to originate simultaneously in both breasts in 1·5 per cent, Harrington (1938) found simultaneous carcinoma in 1·0 per cent and bilateral carcinoma occurring at different times in 4·5 per cent of 4628 cases. In the present series 60, or 2·8 per cent, were found to have growths in both breasts, but 54 of these were considered to be metastases from a pre-existing primary in the other breast, and 6 to be examples of simultaneous carcinoma.

Site in breast.	Number of cases.	Per cent.
Upper and outer quadrant	916	43·0
,, inner ,,	283	13·3
Central, behind nipple	235	11·0
Lower and outer quadrant	204	9·6
,, inner ,,	94	4·4
Diffuse, too advanced to identify the primary site	324	15·2
Not stated	74	3·5

There was 1 patient who had 2 separate growths in the upper inner and lower outer quadrants respectively, making a total of 2130 tumours.

Size of tumour.	Number of cases.	Per cent.
Small—up to 4 sq. cm.	216	10·1
Medium—4–20 sq. cm.	717	33·7
Large—20–100 sq. cm.	752	35·4
Massive—over 100 sq. cm.	193	9·1
Not stated	251	11·8

Ulceration of skin.	Number of cases.	Per cent.
Present	439	20·6
Not present	1614	75·8
Not stated	76	3·6

Skin Metastases. Clinical Involvement of Lymph Nodes.

	Number of cases.	Per cent.
Skin nodules present	245	11·5
,, ,, not present	1789	84·1
Not stated	95	4·5
Axillary lymph nodes involved :		
Unilateral	1195	56·1
Bilateral	76	3·6
No lymph nodes involved	812	38·2
Not stated	46	2·2
Supraclavicular nodes also involved :		
Unilateral	189	9·0
Bilateral	31	1·5

These figures include all cases in which the lymph nodes were palpable; in many of them other complications such as fixation to skin or distant metastases were also present.

Remote Metastases.

	Number of cases.		Per cent.
None found on clinical examination	1075		
,, ,, radiological examination	749	1824	85·7
Metastases present	219		10·3
Not stated	86		4·0

Sites of Metastases in 219 Patients (Multiple in Many Cases).

Mediastinal lymph nodes	27
Lymph nodes, other than regional nodes	7
Skin and subcutaneous tissues	6
Lungs and pleurae	86
Liver and abdominal organs	49
Brain	8
Skull, spine, ribs and sternum	69
Bones of pelvis	24
Bones of extremities	30

This table does not include metastases in the supraclavicular lymph nodes, the figures for which are shown above.

Condition of the Opposite Breast.

	Number of cases.	Per cent.
A cancerous growth was present	60	2·8
Opposite breast had been amputated previously for cancer	23	1·1
Nodular mastitis or cysts present	74	3·5
Opposite breast has been treated surgically or by radiotherapy for mastitis	10	0·5
Normal	1866	87·6
Not stated	96	4·5

Of the 60 cases with growths in both breasts, 6 were considered to be true simultaneous growths, and 54 to be metastases from a primary in the other breast. The 23 cases in which the opposite breast had been amputated for cancer previously may have been either recurrences or second primaries.

General Condition.

	Number of cases.	Per cent.
Obese; general condition not noted	13	0·6
Good condition; no weight loss	1203	56·5
Fair condition; moderate weight loss (up to 2 st.)	468	21·9
Poor condition; considerable weight loss (over 2 st.)	189	8·9
Emaciated	33	1·6
Moribund	27	1·3
Not stated	196	9·2

Other Co-existing Diseases.

Was suffering from diabetes	23	1·1
,, ,, ,, cardiovascular disease	71	3·4
,, ,, ,, pulmonary tuberculosis	5	0·2
,, ,, ,, mental affection (usually senile dementia)	26	1·2

Clinical Stages.

The cases were grouped into 4 clinical stages according to the presence or absence of clinical involvement of lymph nodes, invasion of adjacent tissues and distant metastases, as follows :

Stage I : Growth confined to breast ; no involvement of axillary lymph nodes nor infiltration of skin or muscles.

Stage II : Growth confined to breast ; axillary lymph nodes involved, but no infiltration of skin or muscles.

Stage III*a* : Growth infiltrating skin or muscle, or both, but no involvement of axillary lymph nodes.

Stage III*b* : As in III*a*, but axillary lymph nodes involved.

Stage IV : Remote metastases present. Cases with involvement of the supraclavicular lymph nodes were placed in this stage.

Not staged for lack of data.

Arranged in accordance with this system the numbers in each stage were :

	Number of cases.	Per cent.
Stage I	517	24·3
,, II	400	18·8
,, III*a*	233	10·9
,, III*b*	533	25·0
,, IV	352	16·6
Not staged	94	4·4

In the case of patients who underwent operation, or died soon after admission, the operation and pathological findings where available were used for correcting the staging. Patients not operated on, or who did not die in hospital, were placed in the appropriate stage according to the clinical evidence of extension of the growth and the presence of metastases. The table below indicates when the staging is based on clinical evidence alone and when on histological findings.

Stage I.—Confined to breast ; lymph nodes not involved or doubtful.

	Number.
No lymph nodes involved clinically	95
,, ,, ,, histologically	111
Involvement of lymph nodes doubtful clinically	6
With slight adhesion to skin ; no lymph nodes involved clinically	118
,, ,, ,, ,, ,, ,, histologically	148
,, ,, ,, involvement of lymph nodes doubtful clinically	7
Total number of cases	485

Stage II.—Confined to breast; axillary lymph nodes involved.

	Number.
Axillary lymph nodes involved clinically	44
,, ,, ,, histologically	120
Slight adhesion to skin, with axillary nodes involved clinically	89
,, ,, ,, ,, ,, ,, histologically	214
Total number of cases	467

Stage IIIa.

Fixed to skin or ulcerated; *no* nodes involved clinically	81
,, ,, ,, ,, ,, histologically	33
Adherent to pectoral fascia; *no* nodes involved clinically	5
,, ,, ,, ,, ,, histologically	8
Fixed to skin and pectoral fascia; *no* nodes involved clinically	46
,, ,, ,, ,, ,, ,, histologically	51
Total number of cases	224

Stage IIIb.

Fixed to skin *with* axillary nodes involved clinically	183
,, ,, ,, ,, ,, histologically	125
Adherent to pectoral fascia *with* nodes involved clinically	5
,, ,, ,, ,, histologically	8
Fixed to skin and pectoral fascia; *no* nodes involved clinically	109
,, ,, ,, ,, ,, histologically	108
Total number of cases	538

Stage IV.—Remote metastases present.

Supraclavicular lymph nodes alone involved	144
Remote metastases present	218
Total number of cases	362

Not staged for lack of data 53

Comparison of Clinical and Final Staging.

	Clinical. Number of cases.	Final. Number of cases.	Clinical. Per cent.		Final. Per cent.	
Stage I	517	485	24·3		22·8	
,, II	400	467	18·8		21·9	
,, III*a*	233	224	10·9	35·9	10·5	35·7
,, III*b*	533	538	25·0		25·2	
,, IV	352	362	16·6		17·1	
Not staged	94	53	4·4		2·5	

The 5-year survival rates of patients treated by radical mastectomy who were classified in stages I and II on clinical evidence and on histological evidence respectively were compared, with the following results :

		Number.	Survived.	Per cent.	Difference.
Stage I .	*No lymph nodes involved :*				
	On clinical evidence	70	37	52·9	$10·1 \pm 6·7$
	On histological evidence	235	148	63·0	
„ II .	*Lymph nodes involved :*				
	On clinical evidence	50	21	42·0	$3·6 \pm 7·5$
	On histological evidence	302	116	38·4	

These differences are not statistically significant.

Methods of Treatment and 5-year Results (see Table, pp. 222, 223).

All deaths from any cause within one month of an operation, whether radical or palliative, were counted as " operation fatalities." In the case of radiotherapeutic treatment, those cases in which death appeared to have been accelerated by the effects of radiotherapy have been classified as " died from effects of treatment," regardless of the time which had elapsed since treatment was completed.

There were 4 " operation fatalities " following the insertion of radium needles ; 1 of these was due to shock, 1 to post-anaesthetic pneumonia, 1 to pulmonary embolism and 1 to suppurative pericarditis. Six patients were classified as " died from effects of treatment " ; 1 from pulmonary embolism 2 weeks after the insertion of radium needles ; 1, who was aged 70, appears to have died from radiation sickness shortly after the termination of a course of X-ray treatment, and 4 from radio-necrosis. There was also a patient who died from late radio-necrosis of the rib $7\frac{1}{2}$ years after the operation, making 11 cases in all.

Five-year Follow-up Results for All Cases.

	First year.	Second year.	Third year.	Fourth year.	Fifth year.	Totals.		
Operation fatalities	34	—	—	—	—	34		
Died under treatment	5	1	—	—	—	6	1382	
„ with cancer	551	326	178	146	79	1280		
„ without cancer	10	11	13	9	19	62		
Alive and well	..	..	..	..	447			2129
„ with cancer	..	..	..	..	109	..	664	
„ state unknown	..	..	..	..	108			
Untraced	..	..	..	..	83	..	83	
Total died yearly	600	338	191	155	98	1382		
Percentage of all cases	28·2	15·9	9·0	7·3	4·6			

The five-year survival rate for all cases was 31·2 per cent.

Of the 664 survivors, 47 are known to have died of cancer, and 13 without cancer in the sixth and subsequent years.

Methods of Treatment and 5-Year Results.

Radical mastectomy alone or with Radiotherapy.	Number.	Operation fatalities.	Died from effects of treatment.	Survived 5 years.	Died with cancer.	Died without cancer.	Not traced.	Operation fatalities per cent.
Radical mastectomy	703	22	—	312	299	22	48	3·1
Radical mastectomy followed by H.V. X-rays	334	—	—	134	182	6	12	—
Radical mastectomy preceded by H.V. X-rays	27	3	—	6	17	1	—	11·1
Radical mastectomy preceded and followed by H.V. X-rays	12	—	—	2	10	—	—	—
Radical mastectomy with implantation of radium	15	2	—	7	6	—	—	13·3
Radical mastectomy with implantation of radium followed by X-rays or surface radium	5	—	—	3	2	—	—	—
	1096	27		464	516	29	60	2·5
Local mastectomy alone or with Radiotherapy.								
Local mastectomy*	133	2	—	52	58	16	5	1·5
Local mastectomy followed by H.V. X-rays or surface radium	85	—	—	37	43	3	2	—
Local mastectomy with implantation of radium in lymph nodes	15	1	—	3	11	—	—	6·6
	233	3		92	112	19	7	1·3
Radium alone or with local surgery.								
Interstitial radium alone	74	4	1	9	56	2	2	6·8
Surface radium alone	11	—	—	1	9	—	1	—
Teleradium alone	11	—	—	2	8	1	—	—
Teleradium with H.V. X-rays	8	—	—	—	7	1	—	—
Interstitial radium followed by surface radium	6	—	—	—	4	—	2	—
Interstitial radium followed by X-rays to lymph nodes	10	—	—	2	8	—	—	—

* Axillary lymph nodes excised also in 83 patients.

	Number.	Operation fatalities.	Died from effects of treatment.	Survived 5 years.	Died with cancer.	Died without cancer.	Not traced.	Operation fatalities per cent.
Teleradium followed by interstitial radium	1	—	—	—	1	—	—	—
Excision of tumour followed by implantation of radium	45	—	—	26	14	1	4	—
Interstitial radium followed by local mastectomy	7	—	—	3	4	—	—	—
Teleradium followed by local or radical mastectomy 1 year or more later	2	—	—	1	1	—	—	—
	175	4	1	44	112	5	9	
X-rays alone or with radium implantation and/or local surgery.								
H.V. X-rays alone	270	—	3	19	241	5	2	1·1
H.V. X-rays followed by interstitial radium	59	—	2	15	41	1	—	3·4
H.V. X-rays followed by local mastectomy	32	—	—	9	22	1	—	—
Local mastectomy preceded and followed by H.V. X-rays	2	—	—	1	1	—	—	—
H.V. X-rays followed by interstitial radium and local excision	6	—	—	1	4	1	—	—
Local excision of tumour followed by H.V. X-rays	21	—	—	9	10	1	1	—
Local excision of tumour preceded and followed by H.V. X-rays	3	—	—	2	1	—	—	—
	393		5	56	320	9	3	1·3
Not treated by surgery or radiotherapy	232	—	—	8	220	—	4	—
Grand totals	2129	34	6	664	1280	62	83	
Per cent	100·0	1·6	0·3	31·2	60·1	2·9	3·9	

Analysis of Five-year Results by Methods of Treatment and Stages.

Surgical or Combined Methods.		Stage I.	Stage II.	Stage IIIa.	Stage IIIb.	Stage IV.	Not staged.	Total.
Radical mastectomy	*No.*	*236*	*216*	*72*	*163*	*15*	*1*	*703*
Known survivors		144	88	39	41	—	—	312
Per cent survived		61·0	40·7	54·2	25·2	0·0	0·0	44·4
Per cent of traced cases		68·2	43·6	59·1	25·6	0·0	0·0	47·6
Radical mastectomy combined with radiotherapy	*No.*	*69*	*136*	*26*	*105*	*19*	*38*	*393*
Known survivors		41	49	11	31	4	16	152
Per cent survived		59·4	36·0	42·3	29·5	21·2	42·1	38·7
Per cent of traced cases		64·1	37·1	44·0	30·1	21·2	42·1	39·9
Local mastectomy	*No.*	*61*	*19*	*22*	*21*	*9*	*1*	*133*
Known survivors		34	4	9	4	—	1	52
Per cent survived		55·7	21·2	40·9	19·0	0·0	100·0	39·1
Per cent of traced cases		59·6	21·2	40·9	19·0	0·0	100·0	40·6
Local mastectomy combined with radiotherapy	*No.*	*26*	*23*	*12*	*24*	*8*	*7*	*100*
Known survivors		16	8	6	4	—	6	40
Per cent survived		61·5	34·8	50·0	16·6	0·0	85·7	40·0
Per cent of traced cases		64·0	34·8	50·0	17·4	0·0	85·7	40·8
Radium alone or with local surgery.								
Interstitial radium alone	*No.*	*12*	*5*	*11*	*29*	*17*	—	*74*
Known survivors		3	—	3	3	—	—	9
Per cent survived		25·0	0·0	27·3	10·3	0·0	—	12·2
Per cent of traced cases		30·0	0·0	27·3	10·3	0·0	—	12·5
Interstitial radium with surface radium, teleradium or X-rays	*No.*	*3*	*5*	*2*	*5*	*2*	—	*17*
Known survivors		—	2	—	—	—	—	2
Per cent survived		0·0	40·0	0·0	0·0	0·0	—	11·8
Surface radium or teleradium with/without X-rays	*No.*	—	*2*	*9*	*8*	*11*	—	*30*
Known survivors		—	—	2	—	1	—	3
Per cent survived		—	0·0	22·2	0·0	9·9	—	10·0
Excision of tumour followed by implantation of radium	*No.*	*25*	*10*	*4*	*3*	*2*	*1*	*45*
Known survivors		14	6	2	3	—	1	26
Per cent survived		56·0	60·0	50·0	100·0	0·0	100·0	57·8
Per cent of traced cases		63·6	66·6	50·0	100·0	0·0	100·0	63·4
Interstitial radium followed by local mastectomy	*No.*	*1*	*1*	*2*	*3*	—	—	*7*
Known survivors		—	—	2	1	—	—	3
Per cent survived		0·0	0·0	100·0	33·3	—	—	42·8
Teleradium followed by local or radical mastectomy	*No.*	—	*1*	—	*1*	—	—	*2*
Known survivors		—	—	—	1	—	—	1
Per cent survived		—	0·0	—	100·0	—	—	50·0

X-rays alone or with radium and/or local surgery.		Stage I.	Stage II.	Stage III*a*.	Stage III*b*.	Stage IV.	Not staged.	Total.
H.V. X-rays alone	*No.*	*18*	*22*	*25*	*89*	*114*	*2*	*270*
Known survivors		5	3	3	5	2	1	19
Per cent survived		27·7	13·6	12·0	5·6	1·8	50·0	7·0
Per cent of traced cases		27·7	13·6	12·0	5·7	1·8	50·0	7·1
H.V. X-rays followed by interstitial radium	*No.*	*7*	*5*	*11*	*26*	*10*	—	*59*
Known survivors		3	1	4	7	—	—	15
Per cent survived		42·8	20·0	36·4	26·9	0·0	—	25·4
H.V. X-rays followed by interstitial radium and local excision	*No.*	*1*	—	*2*	*2*	*1*	—	*6*
Known survivors		1	—	—	—	—	—	1
Per cent survived		100·0	—	0·0	0·0	—	—	16·6
H.V. X-rays followed by local mastectomy	*No.*	*4*	*5*	*7*	*15*	*3*	—	*34*
Known survivors		3	1	2	3	1	—	10
Per cent survived		75·0	20·0	28·6	20·0	33·3	—	29·4
Local excision of tumour followed by H.V. X-rays	*No.*	*16*	*4*	—	*2*	*1*	*1*	*24*
Known survivors		9	2	—	—	—	—	11
Per cent survived		56·2	50·0	—	0·0	0·0	0·0	45·8
Per cent of traced cases		60·0	50·0	—	0·0	0·0	0·0	47·8
Not treated by surgery or radiotherapy.	*No.*	*6*	*13*	*19*	*42*	*150*	*2*	*232*
Known survivors		1	—	5	2	—	—	8
Per cent survived		16·6	0·0	26·3	4·9	0·0	0·0	3·4

Of the 8 surviving patients in this group, 2 died of cancer in the 6th and 8th years respectively, 4 are still alive with ulcerating growths; the diagnosis of malignancy has been changed in 1, and no details of the present condition of the other are known.

		Stage I.	Stage II.	Stage III*a*.	Stage III*b*.	Stage IV.	Not staged.	Total.
Total results	*No.*	*485*	*467*	*224*	*538*	*362*	*53*	*2129*
Known survivors		274	170	85	102	8	25	664
Per cent survived		56·5	36·4	37·9	19·0	2·2	47·2	31·2

Truscott (1947) gives the following percentage survival rates after five years for all types of treatment of 836 cases, the cases being staged on the same principles as in the above series.

Stage.	Number.	Percentage alive.
I	250	46·0
II	484	17·3
III*a*	24	8·3
III*b*	78	7·7

According to Table X in Truscott's paper there were 59·6 per cent known 5-year survivors of 114 followed-up stage I cases treated by surgery alone, and 25·8 per cent of 163 followed-up stage II cases. The corresponding figures in the B.E.C.C. series are: 68·2 per cent of 210 followed-up stage I cases, and 43·6 per cent of 202 followed-up stage II cases.

Analysis of 5-year Results by Ages in Relation to Methods of Treatment.

Age group.	Radical mastectomy alone.			Radical mastectomy with radiotherapy.			Local mastectomy alone.		
	Total number.	Known survivors.	Per cent.	Total number.	Known survivors.	Per cent.	Total number.	Known survivors.	Per cent.
15– . . .	1	—	0·0	1	1	100·0	2	2	100·0
25– . . .	17	6	35·3	25	5	20·0	2	1	50·0
35– . . .	132	64	48·5	90	33	36·6	8	5	62·5
45– . . .	221	106	48·0	145	63	43·4	22	9	40·9
55– . . .	210	88	41·9	79	30	37·9	27	10	37·0
65– . . .	107	43	40·2	50	19	38·0	46	16	34·8
75– . . .	14	5	35·7	3	1	33·3	26	9	34·1
Totals . .	702	312	44·4	393	152	38·7	133	52	39·1
	$\chi^2 = 4·29$ $P < 0·70 > 0·50$			$\chi^2 = 5·81$ $P < 0·50 > 0·30$			$\chi^2 = 5·44$ $P < 0·50 > 0·30$		

Similar calculations for the series of cases treated by local mastectomy combined with radiotherapy, by radium with or without local surgery, and by X-rays with or without local surgery showed, as the above figures do, that the variations in survival rates of the different age-groups are not statistically significant.

Radical Mastectomy: 5-year Results by Duration of Symptoms.

The duration of symptoms at the time of operation is tabulated for 368 patients who had radical mastectomy, and for 177 who had radical mastectomy with radiotherapy. The estimates of the duration of symptoms are based on the patients' statements.

Duration of Symptoms.	Radical mastectomy.		Radical mastectomy with radiotherapy.		Totals.
	Number.	Known survivors.	Number.	Known survivors.	
1 month and under .	43	20	16	4	
1–3 months . .	101	52	46	20	
3–6 ,, . .	81	40	44	20	
Total under 6 months . .	225	112 (50%)	106	44 (41%)	331–156 = 47·1%
6–12 months . .	56	19	27	11	
Over 12 months .	77	29	41	20	
Total over 6 months . .	133	48 (36·1%).	68	31 (45·6%).	201–79 = 39·6%
Duration not known	11	4	3	—	
Differences in survival rate . .	—	13·9 ± 5·3.	—	4·1 ± 7·7.	7·5 ± 4·4

These figures show that in the early cases radical mastectomy alone gives the best survival rate, but that in cases of longer standing the survival rate was improved by the use of radiotherapy in addition. The difference in percentage is statistically significant for radical mastectomy, but not for combined treatment.

Analysis of 5-year Results by Site of the Growth in the Breast.

	Radical mastectomy.								
	Stage I. *229.*			Stage II. *207.*			All stages. *668.*		
	Number.	Known survivors.	Per cent.	Number.	Known survivors.	Per cent.	Number.	Known survivors.	Per cent.
Upper and outer	112	73	65·2	123	56	45·5	354	173	48·9
,, ,, inner	56	34	60·7	24	6	25·0	106	48	45·3
Lower and outer	35	20	57·1	28	12	42·8	90	38	42·2
,, ,, inner	8	4	50·0	6	2	33·3	31	15	48·3
Central	18	11	61·1	26	11	42·3	87	37	42·5
Totals	229	142	62·2	207	87	42·0	668	311	46·6
	$\chi^2 = 1{\cdot}51$ $P < 0{\cdot}90 > 0{\cdot}80$			$\chi^2 = 3{\cdot}80$ $P < 0{\cdot}50 > 0{\cdot}30$			$\chi^2 = 2{\cdot}34$ $P < 0{\cdot}70 > 0{\cdot}50$		

It will be seen from the values of χ^2 and P that none of these variations from the mean is statistically significant.

Radical mastectomy : effect on prognosis of slight attachment to the skin.

In the final staging on p. 219 it will be seen that cases in stages I and II with slight attachment to the skin are separated from those in which there was no attachment. This enabled the survival rate after radical mastectomy alone and combined with radiotherapy to be worked out separately, with the following result :

		Number.	Survived.	Per cent.	Difference.
Stage I	Not adherent	128	73	57·0	$6{\cdot}3 \pm 5{\cdot}7$
	Adherent	177	112	63·3	
Stage II	Not adherent	122	46	37·7	$1{\cdot}9 \pm 5{\cdot}4$
	Adherent	230	91	39·6	

These differences are not statistically significant.

Radical mastectomy : effect on prognosis of coincident pregnancy.

There were 10 patients who were pregnant at the time of discovery of the growth in the breast, which was found to be in a relatively advanced stage in all cases. Only 2 of them were treated by radical mastectomy, 1 of whom survived 5 years and 1 died of cancer in the 5th year.

Radical mastectomy : effect on prognosis of exploratory incision.

Data on this point were recorded for 1050 cases of radical mastectomy, with or without radiotherapy in addition :

	Number.	Known Survivors.	Per cent.
Exploratory incision followed by mastectomy immediately	95	58	61·1
Exploratory incision followed by mastectomy after an interval	65	38	58·5
Mastectomy without exploratory incision	536	210	39·3
Not stated	354	138	39·0

The differences in survival rate between those in whom an exploratory incision was made (160), and those in whom this was not done (536), are statistically significant and are probably due to the fact that the former were early cases in which the diagnosis was in doubt. The differences between the two groups in which an exploratory incision was made are not statistically significant.

Ulceration of skin : effect on prognosis (all treatments combined).

The survival rate of cases with fixation to the skin and with actual ulceration were worked out separately. The figures are :

	Number.	Survived.	Per cent.	Difference.
No lymph nodes involved :				
Growth fixed to skin	41	22	53·7	$24·9 \pm 9·4$
Skin ulcerated	73	21	28·8	
Lymph nodes involved :				
Growth fixed to skin	104	24	23·1	$7·4 \pm 4·8$
Skin ulcerated	204	32	15·7	

Ulceration has a serious effect on prognosis, but the difference in the survival rate is only statistically significant in those cases where no lymph nodes are involved.

Estimation of Survival after Treatment.

Dr. Stocks, to whom this question was referred, advised that unless the follow-up of cases makes it possible to assign accurately every death either to cancer on the one hand or to intercurrent causes on the other, the only sound method of dealing with the duration of survival is an actuarial one, which means calculating from a life-table the total months which would be lived in the period of observation by a group of people in the general population having the same sex-age distribution as the group of patients dealt with. This gives the mean number of months expected to be lived during the five years by each group. The mean number of months actually lived is then calculated and expressed as a percentage of the normal expected for that group, making allowances for cases followed up for less than five years.

English Life Table No. 10 (1930–32) was used for ascertaining the expectation of life.

Radical mastectomy alone.	Stage I.	Stage II.	Stage IIIa.	Stage IIIb.
Number of cases of known duration	*210*	*198*	*68*	*158*
Mean number of months lived in 5 years from onset — Maximum possible	60·00	60·00	59·12	59·77
Mean number of months lived in 5 years from onset — Expected	57·20	57·16	56·02	57·04
Mean number of months lived in 5 years from onset — Actual	52·01	43·28	47·59	39·02
Per cent of Expected	91·03	75·72	84·95	68·41
Radical mastectomy with post-operative radiation.				
Number of cases of known duration	*55*	*116*	*21*	*78*
Mean number of months lived in 5 years from onset — Maximum possible	60·00	60·00	59·43	60·00
Mean number of months lived in 5 years from onset — Expected	57·95	57·89	56·78	57·36
Mean number of months lived in 5 years from onset — Actual	51·16	40·53	47·81	41·73
Per cent of Expected	88·28	70·01	84·20	72·75

	Stage I.	Stage II.	Stage IIIa.	Stage IIIb.
Radical mastectomy with pre-operative radiation.				
Number of cases of known duration	*3*	*7*	*3*	*18*
Mean number of months lived in 5 years from onset — Maximum possible	60·00	60·00	60·00	60·00
Mean number of months lived in 5 years from onset — Expected	57·63	58·57	57·63	57·63
Mean number of months lived in 5 years from onset — Actual	46·66	32·00	53·66	37·77
Per cent of Expected	80·93	54·64	93·11	65·54
Radical mastectomy with implantation of radium.				
Number of cases of known duration	*3*	*6*	*2*	*16*
Mean number of months lived in 5 years from onset — Maximum possible	60·00	60·00	60·00	60·00
Mean number of months lived in 5 years from onset — Expected	59·16	58·02	48·04	56·43
Mean number of months lived in 5 years from onset — Actual	60·00	38·00	35·50	45·83
Per cent of Expected	101·42	65·49	73·90	81·22
Local mastectomy alone.				
Number of cases of known duration	*56*	*18*	*21*	*20*
Mean number of months lived in 5 years from onset — Maximum possible	60·00	60·00	60·00	60·00
Mean number of months lived in 5 years from onset — Expected	53·08	52·88	53·27	53·07
Mean number of months lived in 5 years from onset — Actual	51·82	40·28	46·38	37·15
Per cent of Expected	97·63	76·17	87·07	70·00
Local mastectomy with post-operative radiation.				
Number of cases of known duration	*23*	*22*	*12*	*23*
Mean number of months lived in 5 years from onset — Maximum possible	60·00	60·00	60·00	60·00
Mean number of months lived in 5 years from onset — Expected	54·64	56·49	54·31	55·09
Mean number of months lived in 5 years from onset — Actual	55·22	42·09	49·33	39·39
Per cent of Expected	101·06	74·51	90·83	71·50
Interstitial radium alone or with surface radium.				
Number of cases of known duration	*13*	*10*	*12*	*32*
Mean number of months lived in 5 years from onset — Maximum possible	59·08	60·00	57·00	60·00
Mean number of months lived in 5 years from onset — Expected	52·56	55·53	50·59	55·42
Mean number of months lived in 5 years from onset — Actual	41·38	32·80	37·83	29·16
Per cent of Expected	78·73	59·07	74·78	52·62
Interstitial radium with local surgery.				
Number of cases of known duration	*23*	*10*	*6*	*6*
Mean number of months lived in 5 years from onset — Maximum possible	60·00	60·00	60·00	60·00
Mean number of months lived in 5 years from onset — Expected	57·12	58·54	58·16	55·96
Mean number of months lived in 5 years from onset — Actual	49·91	47·20	55·17	47·50
Per cent of Expected	87·38	80·63	94·86	84·88
X-rays alone or with interstitial radium.				
Number of cases of known duration	*25*	*25*	*34*	*112*
Mean number of months lived in 5 years from onset — Maximum possible	60·00	60·00	60·00	60·00
Mean number of months lived in 5 years from onset — Expected	52·08	52·18	53·55	54·87
Mean number of months lived in 5 years from onset — Actual	41·48	33·40	37·38	34·12
Per cent of Expected	79·65	64·00	69·80	62·18
X-rays with local surgery.				
Number of cases of known duration	*21*	*9*	*9*	*19*
Mean number of months lived in 5 years from onset — Maximum possible	58·86	60·00	60·00	60·00
Mean number of months lived in 5 years from onset — Expected	55·38	55·61	53·77	54·80
Mean number of months lived in 5 years from onset — Actual	49·52	48·33	39·33	42·00
Per cent of Expected	89·42	86·91	73·14	76·64

The general conclusions to be drawn from the figures given above are :

1. The 5-year expectation of life after radical mastectomy ranges from 91·03 per cent of normal in stage I down to 68·4 per cent of normal in stage III*b*.

2. The 5-year expectation of life is not increased by post-operative radiation in stages I, II and III*a*, but in stage III*b* (78 cases) there was an increase of 4·3 per cent.

3. The number of patients treated by radical mastectomy with pre-operative radiation or implantation of radium at the time of operation was too small to admit of reliable conclusions being drawn from the figures.

4. Local mastectomy was the method of treatment in 17·0 per cent of those treated by operation, and, though the actual period of survival was much the same as after radical mastectomy, the 5-year expectation of life was relatively higher on account of the high mean age of these patients. These results were slightly improved by post-operative radiation.

5. Local excision of the tumour followed by interstitial radium or X-rays was the method used in a few cases, and gave a 5-year expectation of life almost equal to that afforded by radical mastectomy in stage I, and better than the latter in patients who were in the later stages, especially in stage III*b*, but the numbers so treated were small.

6. Radiotherapy alone gave a lower expectation of life.

7. It was found that patients in stage IV who were not treated either by surgery or radiotherapy had a 5-year expectation of life of 46·7 per cent of normal, which was not improved by palliative X-ray treatment.

All these figures must be considered in the light of the fact that the mean duration of the disease is 38·3 months (Major Greenwood, 1926), so that these patients whose mean age was 57 years would have a 5-year expectation of life of about 56 months ; a 5-year follow-up is therefore insufficient for assessment of the results of treatment. The variations in mean age of the patients submitted to various types of treatment is shown below, and indicates that the more radical methods were used in the younger patients.

	Years.
Mean age of 703 patients treated by radical mastectomy alone . .	54·11
,, ,, 393 ,, ,, ,, ,, combined with radiotherapy	51·18
Mean age of 133 patients treated by local mastectomy alone . .	63·44
,, ,, 100 ,, ,, ,, ,, combined with radiotherapy	59·50
Mean age of 174 patients treated by radium alone or with local surgery	58·25
,, ,, 393 ,, ,, H.V. X-rays alone or with radium and/or local surgery	60·46
Mean age of 232 patients not treated by surgery or radiotherapy . .	64·16

Pathological Report.

	Number.	Per cent.
No histological examination before or after death	743	35·0
Histological examination done before or after death	1386	65·0
Result doubtful	1	
The specimen examined was non-malignant	7	
Carcinoma, type unspecified	106	
Spheroidal cell carcinoma	980	
Adenocarcinoma	190	
,, colloid	28	
,, papillary	6	
Squamous cell carcinoma, keratinizing	2	
,, ,, non-keratinizing	2	
Sarcoma (type not specified 3, spindle cell 2, fibrosarcoma 2, reticulum cell 1)	8	
Paget's nipple	3	
,, ,, with spheroidal cell carcinoma	7	
,, ,, ,, adenocarcinoma	1	
Duct carcinoma	45	

Histological Grade (according to Broders' classification).

Figures for this are omitted owing to the small proportion of cases graded.

Histological report on lymph nodes.

	Number.
No nodes found involved on histological examination	359
Axillary nodes ,, ,, ,,	625
Apical axillary (subclavicular) nodes found involved	36
Nodes not examined histologically	402

The percentage of cases in which there is disagreement between the clinical and histological findings is shown by the following figures:

984 *cases in which a histological examination was made.*

	Number.	Per cent.
No nodes involved clinically; confirmed on histological examination	252	61·3
No nodes involved clinically, but found involved on histological examination	159	38·7
	411	100·0
Nodes involved clinically, confirmed on histological examination	466	81·3
Nodes involved clinically, but found not involved on histological examination	107	18·7
	573	100·0

38·7 per cent more patients had the nodes involved than was evident clinically, whilst in those with nodes clinically involved the enlargement proved not to be malignant in 18·7 per cent.

Basis of diagnosis in 1018 *cases.*

Clinically malignant :	Number.	Per cent.
Confirmed by histological examination and/or autopsy	677	66·5
,, appearance of metastases or recurrence	201	19·7
Diagnosis based on clinical evidence only	123	12·1
Clinically benign :		
Proved malignant by histological examination	15	1·5
,, ,, appearance of metastases or recurrence	2	0·2

Other Primary Growths.

There were 60 patients who had growths in both breasts. In 54 patients the growth in the opposite breast was obviously a metastasis from the primary growth, but there were 6 patients in whose cases the second growth appeared to have started almost simultaneously in both breasts. There were also 23 patients who had had the opposite breast amputated for carcinoma from 1½ to 30 years previously. The average interval between the two growths was less than 5 years in 9 cases, 5–10 years in 8 cases, over 10 years in 5 cases, and unknown in 1. The mean of the intervals was 8·0 years.

Five patients had had cancer of some other organ for which they had been successfully treated ; 11 had simultaneous growths in other organs—bladder 1, uterus 2, lung 2, rodent ulcer 2, stomach 1, vulva 1, rectum 1, ovary 1 ; and there were 4 patients in whom second primaries appeared after the breast growths had been removed—rectum 2, cervix 1, rodent ulcer 1. None of these patients survived.

Cause of Death in 1382 *Patients.*

	Number.
Cachexia	1042
Cardio-vascular disease	47
Cerebral metastases	21
Uraemia	6
Pulmonary complications	95
Sepsis	14
Surgical shock	7
Haemorrhage	3
Pulmonary embolism	16
Intercurrent disease or unknown cause	131

Fourteen of the sixteen deaths from pulmonary embolism were post-operative at a mean interval of 11·5 days; in 1 case the operation had been performed 18 months previously and in 1 case there had been no operation. The diagnosis

was confirmed by autopsy in 12 cases, in 4 of which thrombosis of the femoral, subclavian or saphena vein was found to be the source of the embolus.

Autopsy.

	Number.	Per cent.
No autopsy	1246	90·1
Autopsy done	136	9·9

Relevant autopsy findings (multiple in most cases).

	Number.
Local growth only	22
Extension to neighbouring parts	20
Metastases in supraclavicular lymph nodes	22
,, mediastinal lymph nodes	24
,, lungs, pleurae and thoracic organs	55
,, liver and abdominal organs	62
,, brain	11
,, skeletal system	32
Pulmonary complications	41
Abdominal ,,	7
No growth found (post-operative deaths)	11

RECURRENT CASES—FEMALES.

There were 374 recurrent cases. The type of recurrence, nature of treatment of the primary, and the intervals from operation to first recurrence are shown in the following table.

Treatment of primary.	Number.	Local recurrence.	Metastases.	Local and metastases.	Mean interval in months.
Surgery alone	292	45	—	—	28·1
		—	169	—	37·9
		—	—	78	33·1
Surgery combined with radiation	63	9	—	—	36·6
		—	30	—	23·7
		—	—	24	30·6
Radiotherapy alone	19	4	—	—	10·3
		—	6	—	34·6
		—	—	9	37·4
Totals	374	58	205	111	

The longest intervals were in 2 patients who were found to have metastases in the lung (confirmed histologically) 23 and 20 years respectively after radical mastectomy. There were also 2 patients who had local recurrence (not confirmed

histologically) 16 and 17 years respectively after radical mastectomy. It will be seen that metastases were four times as frequent as local recurrence after radical surgery, and occurred most commonly in the fourth year after operation. The number of patients who had had post-operative radiotherapy was too small for the differences in times of appearance of local recurrence and metastases to be statistically significant.

The patients with local recurrence had a 5-year survival rate of 12·1 per cent. In the other two groups palliative treatment was given in less than half the patients, and the 5-year survival rates were 3·9 and 2·7 per cent respectively.

PRIMARY CASES—MALES (23).

Age distribution.

Age distribution.	Number.	Age distribution.	Number.
45–49	2	65–69	5
50–54	1	70–74	1
55–59	4	75–79	2
60–64	7	80–	1

	Males.	Females.
Mean age	63·5 ± 1·7	57·0 ± 0·4
Standard deviation	8·4 ± 1·2	12·6 ± 0·2
Difference of means	6·5 ± 1·78	

The difference between the mean ages of males and females is statistically significant.

Family history of cancer.

Fifteen patients gave no family history of cancer, and the question was not answered for the remaining 8.

First symptom.

	Number.	Per cent.
Lump in breast	15	65·2
Pain in breast	1	4·3
"Eczema" or ulceration of skin of breast	5	21·7
Bloody discharge from nipple	1	4·3
No symptoms—tumour discovered during routine examination	1	4·3

Interval from first symptom to first consultation.

34·8 per cent of the patients consulted a doctor within 3 months of noticing the first symptom, 26·1 per cent between the third and sixth months, and in 39·1 per cent more than 6 months had elapsed.

Findings on examination.

Location of tumour :	Number.	Per cent.
Right breast	12	52·2
Left ,,	11	47·8
Upper and outer quadrant	5	21·7
Central, behind nipple	15	65·2
Lower and outer quadrant	2	8·7
Diffuse, too advanced to identify primary site	1	4·3
Size of tumour :		
Small—up to 4 sq. cm.	5	21·7
Medium—4–20 sq. cm.	11	47·8
Large—20–100 sq. cm.	7	30·4

Clinical groups.

Stage I :	Number.
Confined to breast; lymph nodes not involved clinically	1
,, ,, ,, ,, histologically	1
	2
Stage II :	
Axillary lymph nodes involved clinically	4
,, ,, ,, histologically	2
	6
Stage III*a* :	
Fixed to skin or pectoral fascia, no nodes clinically	4
Stage III*b* :	
Fixed to skin or pectoral fascia, with nodes clinically	3
,, ,, ,, ,, histologically	4
	11
Stage IV:	
Supraclavicular lymph nodes involved	2
Remote metastases present	2
	4

The percentage of patients who were still in Stage I was only 8·7.

Methods of treatment and 5-year results.

	Number.	Operation fatalities.	Survived 5 years.	Died with cancer.	Died without cancer.	Not traced.	Operation fatalities. Per cent.
Radical mastectomy	8	1	2	1	3	1	12·5
Radical mastectomy followed by H.V. X-rays	2	—	1	1	—	—	—
Local mastectomy	3	—	1	2	—	—	—
Local mastectomy followed by H.V. X-rays	3	—	—	2	—	1	—
H.V. X-rays alone	1	—	—	1	—	—	—
H.V. X-rays followed by interstitial radium	2	—	—	2	—	—	—
Not treated	4	—	—	3	—	1	—
	—	—	—	—	—	—	—
Totals	23	1	4	12	3	3	

Five-year follow-up results for all cases.

	First year.	Second year.	Third year.	Fourth year.	Fifth year.	Totals		
Operation fatalities	1	—	—	—	—	1		
Died with cancer	8	2	2	—	—	12	16	
„ without cancer	—	2	—	—	1	3		
Alive and well	..	..	..	..	3		4	23
„ with cancer	..	..	..	..	1			
Untraced	..	..	..	..	3		3	
Total died yearly	9	4	2	—	1			

The 5-year survival rate for all cases was 17·4 per cent.

Five-year survival rate according to stages.

Stage.	Number.	Known survivors.	Per cent.
I	2	—	—
II	6	2	33·3
III*a*	4	1	25·0
III*b*	8	1	12·5
IV	3	—	—

The numbers in each group are so small that a detailed analysis of survival rate by methods of treatment and stages would not be statistically significant. An actuarial estimation of 5-year expectation of life of 8 patients who had radical mastectomy (Stage I, 2; Stage II, 2; Stage III*a*, 1; Stage III*b*, 3) gave an actual mean survival period of 36 months, which was 72·48 per cent of normal. If 2 patients who had post-operative radiotherapy are included, the figures are 38·9 months and 75·31 per cent of normal expectation.

Pathological report.	Number.	Per cent.
No histological examination before or after death	8	34·8
Histological examination done before or after death	15	65·2
Spheroidal cell carcinoma	10	
Adenocarcinoma	1	
Duct carcinoma	2	
Basal cell carcinoma	2	

Histological report on lymph nodes.

No nodes found involved on histological examination	2
Axillary nodes ,, ,, ,,	9
Nodes not examined histologically	4

In 2 of the 9 positive cases the nodes were not involved clinically.

Basis of diagnosis.

	Number.	Per cent.
Clinically malignant, confirmed by histological examination	15	65·2
Clinically malignant, confirmed by appearance of metastases or recurrence	4	17·4
Diagnosis based on clinical evidence only	4	17·4

Cause of death in 16 *patients.*

	Number.
Cachexia	8
Cardio-vascular disease	2
Pulmonary complications	4
,, embolism	1
Unknown	1

Autopsy.

Autopsy was performed on 1 of the 16 patients who died, and multiple metastases were found.

RECURRENT CASES—MALES.

There were 3 patients with recurrences following radical mastectomy in 2 cases, and local mastectomy in 1. All 3 had had post-operative radiotherapy, and were in the third year following operation. All had metastases and died within a few months.

SUMMARY.

1. A statistical analysis of 2529 cases of cancer of the breast. 2152 of these were primary cases, 2129 females and 23 males.

2. 22·1 per cent of the female patients were single women and 77·8 per cent were married or widowed. The mean age of the single women was 55·6 years and that of the married and widowed 57·4 years.

3. The percentage of childless marriages amongst 1658 married and widowed women was 16·1 as compared with 12·5 in published control series.

4. A lump in the breast was the first complaint in 77·4 per cent of the patients, pain either local or referred in 11·6 per cent, discharge from the nipple in 2·2 per cent, and symptoms due to metastases in 1·6 per cent. In 1·6 per cent the tumour was discovered by the doctor or during routine examination, having caused no symptoms.

5. 44·1 per cent of the patients consulted a doctor within 3 months of noticing the first symptom, 15·3 per cent during the next 3 months, and in 33·3 per cent the symptoms were of over 6 months' duration before advice was sought.

6. 85·6 per cent of those who consulted a doctor were referred to hospital at once, but 3·6 per cent were told that the condition was not serious, and 4·8 per cent were treated by palliative methods for more than 6 months.

7. On admission to hospital it was found that 59·7 per cent of the patients had clinical involvement of the axillary lymph nodes and 10·3 per cent had clinically recognizable distant metastases. Four stages were defined, and in the final grouping 22·8 per cent of the patients were placed in Stage I, 21·9 per cent in Stage II, 35·7 per cent in Stage III and 17·1 per cent in Stage IV.

8. 703 patients were treated by radical mastectomy alone with an average 5-year survival rate of 47·6 per cent of traced cases, ranging from 68·2 per cent of those in Stage I down to 25·6 per cent in Stage III*b* ; the operation mortality was 3·1 per cent.

393 patients were treated by radical mastectomy combined with radiotherapy, with an average 5-year survival rate of 39·9 per cent of traced cases, ranging from 64·1 per cent of those in Stage I, down to 30·1 per cent of those in Stage III*b*. Local mastectomy alone in 133 patients gave a 5-year survival rate of 59·6 per cent of traced cases in Stage I, down to 19·0 per cent in Stage III*b* ; these results were improved when local mastectomy was supplemented by radiotherapy in 100 cases. The patients treated by local mastectomy were on the average older than those treated by radical mastectomy.

9. Treatment by radium and X-rays was usually only palliative, but there was a group of 45 cases in whom local excision of the tumour was followed by implantation of radium, with a survival rate of 63·4 per cent of traced cases for all stages.

10. The results of different methods of treatment were assessed by actuarial methods, in which allowance is made for the ages and consequent expectation of life of the patients. It was found that radical mastectomy gave a 5-year expectation of life ranging from 91·03 per cent of normal in Stage I, down to 68·4 per cent of normal in Stage III*b* ; post-operative radiation improved these results by 4·3 per cent in Stage III*b*, in other stages the results were not so good as those of radical mastectomy alone. Other methods of treatment were assessed in the same way.

11. 31·2 per cent of all patients survived 5 years, ranging from 56·5 per cent of those in Stage I, down to 19·0 per cent of those in Stage III*b*, and 2·2 per cent of those in Stage IV.

12. Histological examinations were made in 65·0 per cent of the patients ; 38·7 per cent who had no clinical evidence of involvement of the axillary lymph nodes were found on microscopical examination to have them involved ; on the other hand, nodes which were considered on clinical grounds to be malignant were found in 18·7 per cent not to be so on microscopical examination.

13. There were 20 male patients, whose mean age was 63·5 years. Their 5-year survival rate was 17·4 per cent.

The Committee wish to thank Mr. A. J. Durden Smith, Dr. Frank Ellis and Mr. Stanley Lee, who constituted the Sub-committee which revised and edited this report, for their valuable advice and help.

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THE DUODENAL SPREAD OF PYLORIC CARCINOMA.

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Received for publication August 20, 1948.

IN his 'Textbook of Pathological Anatomy' Rokitansky (1861) made his classical statement that pyloric cancer was exactly bounded by the pyloric ring, and that the growth never reached beyond into the duodenum. From this time it appears that the majority of observers, with the early exception of Brinton (1864), commented upon the integrity of the duodenum in cases of carcinoma of the stomach. Many well-known surgical teachers spoke of the habitual immunity of the duodenum from invasion. Kocher (1893), Mikulicz (1898) and Most (1899) believed it to be always constant. Kocher ventured that it was a problem of extreme interest to consider why gastric carcinoma grows in almost all cases towards the cardia, yet stops, on the contrary, at the duodeno-pyloric junction.

It was Brinton who first took especial exception to this proposition of Rokitansky. He brought against it criticisms founded upon numerous personal case-observations: "We may justifiably apply to it a criticism of unusual severity—a criticism which, even if it weigh every word, will scarcely do more than the author's (Rokitansky's) terse and weighty proposition really deserves." From 125 cancers of the pylorus studied by Brinton, there were no less than ten cases in which the disease was not bounded by the valve, but passed beyond it for a variable distance, often an inch or two inches, into the duodenum. He gave no information concerning the method of this spread. Brinton concluded by saying the rules which Rokitansky had the merit of laying down were, in this respect, like many others in pathology, of general though not of universal importance; their value was not much affected by occasional exceptions. This question of duodenal invasion by pyloric cancer seemed to present a surgical problem of